

D.18 Changes in SATURN 10.9

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SATURN 10.9 was first released in pre-Beta version in December 2008 (with purely temporary version numbers 10.9.1, 10.9.2 etc.) and as a full release (official 10.9.12) in November 2009.

Significant new features include new style .UFC files (see note 4), D.18.2) and phased in blocking back (note 6), D.18.3). Try them out!

In terms of backwards/forwards compatibility the 10.9 network .dat files contain several new features (e.g., parameter names) which will **not** be recognised by pre 10.9 versions of **SATNET** but will not cause the program to crash; however pre 10.9 .dat files will be read perfectly happily by 10.9. Similarly 10.9 network .ufs files contain new arrays which older version exe's will be able to read but not recognise whereas 10.9 exe's will be able to read pre 10.9 ufs files. Matrix .ufm files have not fundamentally changed and should be both forwards and backwards compatible.

In terms of results there have been a large number of both relatively major and minor changes to the simulation so that one might expect 10.9 to give different – possibly significantly different – results to pre 10.9. For this reason the opportunity has been taken to change the default values of a number of parameters, typically options that were introduced in recent releases but “turned off” by default are now “turned on” having been verified in practice.

Our advice therefore would be to re-run old networks “from scratch” and certainly not to do comparisons between 10.9 outputs and pre 10.9 outputs.

The following sections describe the changes made in **SATURN** 10.9, some of which are also included in version 10.8.21 and/or 10.8.22 and listed in Appendix D-17.

D.18.1 SATNET

- 1) A check is made whether LTP has been explicitly set in the &PARAM records in the network .dat file and, if not, a warning message is printed. This follows from the fact that the default value, 30 minutes, is probably **not** the preferred value for most applications. See 8.4.5.
- 2) Extra checks on network connectivity have been added: (a) on the assignment network (previously included as Warning 47 but only if EXPERT = T and PRINT = T); (b) the map network and (c) O-D pairs in the trip matrix for which no route exists (previously included within **SATALL**). Non-Fatal Errors 277 and 278 have been added to cover (c) and (b) respectively with both upgraded to Semi-Fatal Errors under WRIGHT = T. See 5.5.4.

- 3) Q105 and RB106 are now always assumed to be .TRUE. within the programs. Ditto LCR108. So, in effect, they are no longer parameters and changing their values in a network .dat file has no effect. See 8.4.7, 8.7.3 and 8.4.4.
- 4) A &PARAM parameter FLAREX has been added to model explicit flares for X-turns at signals. See 8.2.5.2.
- 5) TAX values may now be added at the end of a simulation link data line. See 6.4.15 (and also note 25 below and 6.4.14)
- 6) New advice is provided on the tricky problem of coding extra "pseudo" lanes for X-turns at signals and/or flared lanes which makes maximum use of the new TAX and FLAREX options above. See 6.4.9.4.
- 7) Allow clear exits – priority modifier C – for filters at signals. See 6.4.2.6.
- 8) Warning 13 – not all obvious roundabout turns coded – is now Semi-fatal under WRIGHT = T as is non-fatal error 234 – an X-turn at signals which is unopposed.
- 9) The default values for RTP108, MONACO, AUTONA, AUTOK and AUTNUC are changed to .TRUE. (but, unlike Q105 etc. above, they still have an effect if turned to .FALSE.). See 8.6.3, 8.2.5, 9.5.4, 9.3.1 and 15.15.2 respectively.
- 10) \$INCLUDE may now have a time period subscript; e.g. use "\$INCLUDE(3) file" if file is only applicable to time period 3 in a multiple time period .dat file. See 15.30 and 17.4.4
- 11) Default for NIPS set to 2, 19/01/09. See 9.12.2.
- 12) A new logical parameter BANKER has been added which, if T (default is F), outputs an ascii file with extension .BNT with a complete list of banned turns including both U-turns and turns into non-exit 1-way roads in addition to explicitly banned turns under either 11111 or 44444 data inputs. Also in 10.8.21. 29/01/09.
- 13) The rules for defining KNOBS data (in particular tolls) on simulation centroid connectors have now been relaxed so that it is possible to define a simulation centroid connector by its zone number and a **single** node number, i.e., the two numbers at either end of the dashed CC lines on network plots, the obvious way to define them. However, strictly speaking, simulation centroid connectors need a zone number plus two node numbers to define a link but this is difficult and counter-intuitive. Indeed the use of "wildcard" entries (zone only) is strongly recommended. See 15.14.5. 20/03/09. 10.9.5.
- 14) A new &OPTION parameter PLFF3 has been introduced such that, if TRUE, links in a text file containing pre-loaded flows (hence PLODFF = T) need

only be defined by an A-node and B-node; i.e., no 3rd field containing a 0 is necessary in order to distinguish turns from links. See 15.5.4.

- 15) A new parameter DCSV allows default buffer speed-flow curves by capacity index to be defined in free format within the 33333 data records. This eliminates potential problems of column definitions when DUTCH = F or T. See Note 4) in 15.9. 10.9.5. 07/04/09.
- 16) A new algorithm is used to estimate better values of XYUNIT by comparing input coded distances with calculated crow-fly distances by excluding: (a) links which only lead to zones and which may well have artificial distances and (b) obvious outliers. 10.9.6. 25/04/09
- 17) A new method to interpolate missing X,Y node co-ordinates has been added to cover the situation where there are **two** undefined nodes on links between two defined nodes (as opposed to just one previously). 10.9.6. 26/04/09.
- 18) The default value of the &PARAM parameter CROWCC has been changed to .FALSE. in order that, by default, buffer centroid connector distances which are input as zero are not re-set by their crow-fly distances. See 15.10.3. 10.9.8. 10/07/09.
- 19) The network coding practice of sub-dividing a link into a short series of 2-arm "artificial" nodes (e.g., to give it "shape") has now been formally identified as a "chain" of nodes with applications to blocking back, random delays, etc. etc. where we expect the series of links to function as a single link in some respects. More complicated examples of the same basic phenomenon are also identified. See 5.1.12 and 8.5.5. Chained links may also be displayed within **P1X**.
- 20) User-class specific values of SUET (virtually never used) may now be defined as a subscripted &PARAM Namelist variable. E.g., SUET(2) = 0.5 sets the value of SUET for user class 2 only. See 7.3.3. 10.9.10. 12/08/09.
- 21) A new parameter FREE88 allows the values of PPM, PPK and KNOBS weights per user class to be input in free format – so as to avoid problems with trying to define values within 5 columns. See 6.11, note 12). 10.9.10. 12/08/09.
- 22) MYTVV, which selects the algorithm used for signal optimisation, now defaults to 5 rather than 1. The differences should be slight. See 15.31.3. 10.9.10. 12/08/09.
- 23) Maximum free-flow speeds (CLICKS) disaggregated by both vehicle class and capacity index (KLUNK = 1) may now also be defined by including single records with a V in column 1 under the 33333 buffer data records as an alternative to using an external FILVSD file. See 15.47.2. 10.9.10. 13/08/09.

- 24) An alternative algorithm for interpolating between two non-connected nodes in a bus route based on minimum distance has been created. It may be used if the normal direct-line method fails provided a parameter MINDER = T. See 15.18. 10.9.10. 14/08/09. Equally the direct-line method has also been improved, in particular to avoid “diversions” down spigot zone connectors.
- 25) The simulation link record 2B which previously has been used to define simulation link speed-flow curves may now also be used to define link-specific values for TAX and FLAREX. See 6.4.14. 10.9.10. 17/08/09.
- 26) The default value of NITS (maximum number of simulation iterations) has been increased from 10 to 20. See 8.1. 10.9.10. 29/08/09.
- 27) The default for NITA_M has been reduced to 1 under OBA (but is still 3 under Frank-Wolfe). 10.9.13. 30/11/09.
- 28) A new Serious Warning 138 has been added to detect roundabouts where, e.g., the saturation flows coded for two or more arms are the same but the number of lanes differs. Strictly speaking, it tests for significant differences in saturation flow per lane between different arms. See 6.4.7. 10.9.13. 5/12/09.
- 29) Another new Serious Warning 167 tests for centroid connectors from a buffer zone which are, e.g., coded as 2-way but the out-bound link(s) from the buffer node is 1-way. See 16.6.4. 10.9.13. 5/12/09.
- 30) A new Warning detects possible simulation nodes where there appear to be sufficient links on an outbound arm to justify using a Clear Priority Modifier on an exit turn. See 6.4.2.6. 10.9.13. 06/12/09.
- 31) Incorrectly including &PARAM namelist variables within &OPTION now results in a Fatal Error 486 (in the same way that including &OPTION variables under &PARAM is currently FATAL 486). 10.9.14. 10/12/09.
- 32) The output .bus files produced if BUSKER = T are now consistently either 10 nodes per line or 13 nodes per line depending on whether there are 5-digit nodes **anywhere** in the network or not, not just on the individual routes. 10.9.14. 19/01/10.
- 33) Bus-lanes may now distinguish between bus-only lanes, tram-only lanes and bus-or-tram lanes by using the letters B, S and T respectively on simulation link records. 10.9.15. 01/02/10.
- 34) An alternative, more forgiving, set of TOPUP rules has been introduced whereby the data input for simulation nodes may be duplicated in \$INCLUDE files via a parameter DOUBLE = T under &PARAM. This makes it easier to create alternative scheme networks based on a master version. See 6.15.3. 10.9.15. 04/03/10.

- 35) Various Warning messages which create Semi-fatal errors under WRIGHT = T have been upgraded and renumbered as Serious Warnings. Thus Warning 13 becomes Serious Warning 168, 17 to 169, 76 to 176 and 77 to 177. Thus none of the remaining Warnings become Semi-Fatal under WRIGHT = T, only certain Serious Warnings and Non-Fatal errors. 10.9.16. 07/04/10.
- 36) In addition the set of Serious Warnings and Non-Fatal Errors which **are** upgraded to Semi-Fatal under WRIGHT = T has been increased significantly. For a full list see Appendix L. 10.9.16. 07/04/10.

D.18.2 SATALL

- 1) Extra warnings, Serious Warnings and Non-fatal errors identified within **SATALL** have been added to the lists produced by **SATNET** so that the lists of errors displayed in, say, **P1X** now includes errors from both **SATNET** and **SATALL**.
- 2) If MASL = 1 and SAVEIT = T the output .UFC file is always based on the actual (single) assignment, not an extra SAVEIT assignment; see also UFC109 under 4). 15.23.2.
- 3) The default value for UNCRTS changed to 0.05 from 0.2.
- 4) A new option UFC109 has been introduced and set under namelist &PARAM in network .dat files. If UFC109 = T (default = F) two things happen.

Firstly, the output .UFC file under multiple user classes stores the sets of link **times** per iteration as opposed to link (generalised) costs by both iteration **and** user class. This is possible because the times per iteration are constant between all user classes on the same Frank-Wolfe iteration; the costs may differ but only because the fixed costs per user class differ however, since the fixed costs are fixed throughout (by definition), it is straightforward to construct the costs per iteration/UC by adding (stored) times per iteration to fixed costs by user class. This means that the .UFC files produced under UFC109 will be reduced in size by a factor of 1/NOMADS with only a very small overhead in reconstructing costs as required for secondary analysis. Note that for a single user class we continue to store costs, not times, since there is no difference in file size and it would only save a small overhead.

Secondly, the costs/times may be stored as a rolling summation of **all** Frank-Wolfe iterations over **all** simulation-assignment loops instead of re-creating the assigned route flows by an extra SAVEIT iteration. This has the benefit that any secondary analysis, e.g., skimming, based on routes is exact, not an approximation. The dis-benefit is that there may be many more rolling iterations in total than there would be in a SAVEIT assignment which means that: (a) the.UFC files are larger and (b) any secondary analyses take longer. However, if the number of rolling iterations becomes too large

(greater than NITA_C – see below) then we revert to an extra SAVEIT assignment. See 15.23.3. 10.9.5. 04/04/09

- 5) A new &PARAM integer parameter NITA_C sets the maximum number of rolling FW iteration costs/times which may be stored in a .UFC file when UFC109 = T. See 15.23.3. 10.9.5. 04/04/09.
- 6) The choice of convergence rules set by KONSTP has been extended to allow the combination of either the ISTOP link flow criterion with a maximum cpu time or minimum GAP value with maximum cpu time. Both are more sensible than simply setting a maximum cpu time on its own. See 9.3.2. 10.9.5. 05/04/09.
- 7) The possibility that a run of **SATALL** may terminate with error level 2 (indicating that it has converged only on the maximum number of loops MASL, not, e.g., on ISTOP) has been removed. Previously STOP 2 might cause a long batch file run to hang. 10.9.5 and also 10.8.22. 08/04/09.
- 8) A new command line parameter QUICK, if used, artificially reduces all loop etc. counters such as MASL, NITA, NITS etc. to minimal values so that the program runs in minimal CPU. Useful for checking if long batch files have been set up correctly. See 14.10. 10.9.7. 13/05/09.
- 9) The option AUTONA, in addition to potentially adjusting NITA at each loop, now also sets UNCRSTS in order to allow the assignment to converge better. 10.9.8. 30/06/09.
- 10) New advice is now provided in the manual on the choice of stopping criteria for the assignment-simulation loops. In brief our recommendation is to use a Gap value rather than %FLOWS (although the preference is fairly marginal). See the discussion in 9.2.3. 14/04/10.
- 11) Disaggregated cpu times broken down by, e.g., simulation and assignment, now include explicit times before and after the main loops (basically inputs and outputs). These are printed at the end of the .LPT files. 10.9.17. 12/06/10.
- 12) The calculation of the optimal step length used under AUTOK to average two assignments based on the simulation has been “improved” so that it should take fewer iterations to identify the optimum. See 9.3.2. 10.9.17. 01/06/10.
- 13) The order in which the nodes are considered within a single internal simulation iteration has been changed so that instead of simply taking them in a pure numerical order a topologically-based strategy of working from the outside of the network inwards has been adopted. In principle this should reduce the number of required internal iterations. See 8.3.4. 10.9.17. 01/06/10.

D.18.3 Simulation

- 1) The method for calculating random delays upstream of links which block back has been modified so that the capacity used in the formula is the capacity BEFORE blocking back was applied. This removes a possible discontinuity when the link downstream goes from a state of blocking back to not blocking back or vice versa. See 8.6.5.
- 2) Arrays of simulation turn delays broken down by: (a) V>C permanent queues, (b) random delay and (c) CFP only have been created and may be accessed within **P1X**.
- 3) Random delays are **not** included on links which are part of "internal" chains of 2-arm "artificial" nodes. See 8.6.4. 10.9.7. 01/06/09
- 4) The equation used to define delays on Q-turns has now been "parameterised" in the sense that the numerical constants 226 and 0.75 (see Equation (Q-10) in Appendix Q) may now be user-set via Namelist parameters QDMAX and QVCMIN under &PARAM.
- 5) The rules for blocking back on links which have been artificially sub-divided into one or more continuous sub-links (e.g., to provide a link "shape" via 2-arm dummy nodes) have been made more general. Set BB109 = T to invoke the new rules. See 5.1.12 and 8.5.5. 10.9.9. 25/07/09.
- 6) Blocking back may also now be "phased in" when the queue on the link is only slightly smaller than the stacking capacity by setting BB109 = T and BBKING < 1.0 See 8.5.6. 10.9.9. 25/07/09.
- 7) The calculation of capacities for X-turns at signals – and of any turns with which they share lanes – has been extended by the introduction of an explicit length of flared lane denoted by FLAREX. See 8.2.5.2 and notes 4) and 26) under **SATNET** D.18.1 above. 17/08/09.

D.18.4 SATME2

- 1) Certain errors in input in the control file have been upgraded to semi-fatal and result in the program being terminated once it has got to the end of the inputs.
- 2) Extra warning messages have been added if (a) the number of frozen cells appears to be too large and (b) if the total number of trips changes significantly post ME2.
- 3) A summary table of stats per internal iteration – Table 9B – is included at the end of the internal iterations. 15/01/09.

- 4) Zonal constraints (input data segments 22222 and/or 33333) may now be duplicated in the sense that a GT and a LT constraint may now appear for the same zone, effectively defining a range. 13.1.7. 10.9.6. 17/04/09
- 5) A new table (11.c) has been added to the output .LPM file to list all origin and destination zonal totals before and after and to compare the two. 13.1.5. 10.9.6. 25/04/09.
- 6) The name of the output .ME2 file is now based on the output matrix filename (change .UFM to .ME2) rather than the counts file. 13.8. 10.9.8 13/06/09
- 7) The contents of the output .ME2 file have also been extended so as to include the link sensitivity variables as normally contained in Table 10 and described in 13.3.11. Also in 10.8.22. 05/05/09.
- 8) The original input “actual” counts from **SATPIJA** are now included in the .UFP file as well as the “demand” counts and passed to **SATME2** where they now appear in Table 1. They are also included within the .ME2 files passed to **P1X** where they may be displaced under ME2 Analysis. 10.9.13. 15/10/09.
- 9) The .ME2 files created by **SATME2** and passed to **P1X** now include information on the various namelist parameters set within both **SATME2** and **SATPIJA**. They may be displayed as a text window under ME2 Analysis in **P1X**. 10.9.13. 15/10/09.

D.18.5 SATSUMA/SATTPX

- 1) QUIET option now allowed. See 14.9.
- 2) The first time period may now have a PASSQ flow input by defining PASSQ = T and FILPLD under &OPTION in the base network .dat file. See ??

D.18.6 SATDB

- 1) The minimum-maximum number of columns allowed in the link data base has been increased from 8 to 12. In other words if your network is at the limit of the number of assignment links then you can create at least 12 data columns, but if you are below the limit you may have up to 24 data columns.
- 2) The batch file satbuf has been updated to function properly for networks where DUTCH = T and link A- and B-nodes need to occupy 10 columns each, not 5, on the output file. See Section 15.8.2. 10.9.15. 05/02/10.

D.18.7 General

- 1) No .LOG files created when interactive programs such as **MX** or **P1X** are run in KEY + VDU mode. Also in 10.8.21. 12/01/09.

- 2) If the file sat10key.dat cannot be opened because it is temporarily in use by another program running in parallel the program pauses briefly and tries again. Also in 10.8.21. 15/01/09.
- 3) Unidentified “tokens” on a command line now result in Fatal Errors; e.g., trying to invoke PASSQ under **SATALL** instead of within **SATNET**. 10.9.7. 28/05/09.
- 4) Default .LP files created under commands such as MX I or even \$MX (to simply run the .exe file directly) are assigned names such as mx1.lpx, mx2.lpx, if the normal default file mx.lpx is currently open. This may occur if several jobs are being launched simultaneously. 10.9.8. 05/07/09.
- 5) The program **SATED** is no longer included with the standard .exe files since all its essential functions are embedded within **P1X**. 10.9.10.

D.18.8 P1X

- 1) A red bar has been added on individual node plots to indicate when an exit and/or entry link is blocking back. Also in 10.8.21. See 11.2.2. 24/01/09
- 2) Blocking back values on both entry and exit links has been added to set 3 of the link data as displayed under individual node graphics. 24/01/09
- 3) An explicit option to print standard Node Table 2 (Flow and delay data) from within Node Graphics and/or the last table previously used has been added. Also in 10.8.21. See 11.2.3. 27.01/09
- 4) Output to .JPG files should now be operational. Also in 10.8.21. 01/02/09.
- 5) Differences in network coding of individual simulation nodes between networks 1 and 2 may now be “highlighted” and node graphics loops over those nodes that differ may be initiated. This is a very useful option for discovering what other people have done to your network and not documented while you were on holiday! A complete table of differences per node is printed out automatically to the .LPP file (but, for the moment, can only be viewed by going to the .LPP file afterwards, not interactively). A similar option is also available in **SATLOOK**; see note 3) in D.18.9. See 11.6.5.4. 20/03/09.
- 6) Similarly within the **SATLOOK** standard text tables a new option, #25, has been added to print a full list of coding differences for an individual node. N.B. Only available when **SATLOOK** is called as a sub-component of **P1X**, not with **SATLOOK** as a free-standing program. See 11.11.1. 20/03/09.
- 7) Under network editing the 11111 data segment when \$INCLUDE files have been included **P1X** now keeps track of whether changes have been made to simulation nodes within individual \$INCLUDE files and offers the option at

the end of node editing to only re-create those files which have been updated. 10.9.7. 10/05/09.

- 8) In node graphics it is now possible to jump directly to an adjacent node by clicking on its node number at the end of its arm on the current plot – rather than selecting the option from the banner and then clicking at the end of the arm. See 11.2.1. 10.9.7. 12/05/09.
- 9) Double clicking on a simulation node whilst in network plots will lead directly to node graphics for that node. See 11.2.1. 10.9.7. 20/05/09.
- 10) When editing simulation nodes under node graphics it is now possible to return directly to the same data field as previously edited without having to repeat all the intermediate steps. E.g., if you have recently re-set the saturation flow for one particular turn you may choose to repeat the identical operation with one mouse click. 10.9.7. 30/05/09.
- 11) The logical namelist variable PANDP in the “standard” preferences file P1X0.DAT has now been set to T (so that the “pick’n’plot” rule is applied when selecting new link data to annotate as opposed to “Add to D.B.”) in accordance with the default set within the program. Apparently it may have alternated between T and F in recent releases. If you prefer it to be F (e.g., because you have various key files implicitly that assume it is F) then you will need to amend your preferences file accordingly. 10.9.7. 01/06/09.
- 12) Forest display now includes measures of the path-averaged time, distance, speed, etc. etc. in the banner. 10.9.10. 30/07/09.
- 13) Around 20 extra items have been added to the lists of link data that may be selected for annotation to include, e.g., flows aggregated over vehicle classes, crow-fly distances and differences between crow-fly and coded link distances, links which are part of “chains”, simulation convergence statistics per link, etc. etc. See Appendix I.1. 10.9.13. 23/10/09.
- 14) Similarly extra items have been added to the list of simulation turn data as used either for network-wide turn annotation or for individual node graphics. See Appendix I.2. 10.9.13. 23/10/09.
- 15) The “housekeeping” menu under link display now contains an option to delete data base columns as well as to hide/display them. 10.9.13. 15/11/09.
- 16) The lists of “10 worst” convergence parameters now includes a measure of how much signalised junctions **might** be improved through signal optimisation ranked by the amount by which the maximum V/C ratio could be reduced. This helps to identify badly coded junctions which may be impeding convergence. 10.9.13. 01/12/09.
- 17) Options have been added so that when a new file containing X,Y coordinates is created the format may be changed (e.g., to CSV from fixed

column) and the factor XYUNIT may be explicitly added so that the co-ordinates are output in units of metres. See 11.9.7. 10.9.14. 12/09/09.

- 18) The Select Link Analysis main menu now displays the filename of the trip matrix being assigned and allows it to be re-defined (so that if you want to do a SLA for network 2 you may also select the trip matrix from network 2). See 11.8.1.8. 10.9.15. 05/02/10.
- 19) The node graphics displays now explicitly plot flared lanes both nearside and offside. 10.9.15. 01/02/10.
- 20) A new link data set consisting of "link properties" such as flare lengths may now be selected within node graphics. 10.9.15. 01/02/10.
- 21) A new "resume" option automatically creates (/overwrites if necessary) a file last_p1x0.dat containing all the relevant parameters and window information at the point of exit from **P1X** such that that file may be picked up by the very next run of **P1X** enabling the next run to resume with the same conditions as the last. Extremely useful! See 11.4.4. 10.9.15. 13/02/10.
- 22) A link to the display of **all** individual bus routes has been added within the Validation menu; at present only those with timing points may be accessed. 26/03/10. 10.9.16.
- 23) An option to print a full table of bus route summary statistics (currently option 6 within **SATLOOK**) is now available under Information/Bus Routes/Options. 26/03/10. 10.9.16.
- 24) The validation of timed routes now permits an average turn delay to be included within the final simulation link of a timed route so as to be consistent with the other definitions of timing points. See 11.7.2.1. 31/03/10. 10.9.16.
- 25) A text output file may be created containing a full list of **all** nodes formed by the union of two topologically different networks with their common sequential node numbers. See 11.4.2. In turn this may be used by SATCOBA; see D.18.12. 10.9.16. 01/05/10.
- 26) The "double-click" option to select a node for node graphics is now entered into the log files and will be correctly recognised in subsequent key files. See 11.12.1. 10.9.17. 08/05/10.
- 27) The "resume option" (21 above) has been extended such that the file last_p1x0.dat not only contains the co-ordinates of the **last** window used, it also remembers **all** the previously saved windows from the previous run (which might also be entered in a .WXY file). 10.9.17. 11/06/10.
- 28) Node graphics images may now be output as .JPG files. 10.9.17. 12/06/10.



D.18.9 SATLOOK

- 1) A facility to skim O-D time, distance and tolls simultaneously from a forest (as opposed to carrying out 2 or 3 separate skims in order to reduce CPU time by a factor of roughly 2 or 3) has been added. This may be called either interactively under main option 9, via a standard batch file SKIM_ALL (cf SKIMTIME, etc.) or in SATTUBA. See 15.27.7. Also in 10.8.21. 24/01/09.
- 2) An option has been included within SATTUBA to exclude all times and distances on centroid connectors (which, in practice, means buffer centroid connectors) from skims on the assumption that they are essentially arbitrary. However toll skims continue to include centroid connectors. See XCCSK under 15.41.4. 10.9.8. 10/07/09.
- 3) An option to print all differences in coding between common simulation nodes in networks 1 and 2 is now available but only when **SATLOOK** is called as a sub-component of **P1X**. See also note 5) under D.18.8 above. See 11.11.18. 10.9.10. 14/08/09.
- 4) The filename conventions used in SATTUBA and SKIM_ALL etc. have been changed such that an output time file net.t.ufm becomes net_t.ufm; i.e., full stop becomes an underscore. 10.9.13. 01/12/09.
- 5) SKIM_ALL now outputs up to 4 skimmed matrices by including a matrix of time penalties (in seconds) if any exist. 15.27.7. 10.9.16. 21/04/10.
- 6) A new set of O-D skimming algorithms have been introduced under standard batch procedures such as SKIM_TIME, SKIM_ALL, etc. etc which are more CPU-efficient than the old versions and also form the basis for new multi-core versions. On the other hand they use more RAM so, for that reason, they are only available in the standalone batch version of **SATLOOK**, not in the interactive versions and/or accessed via **P1X**. See 15.27.8. 10.9.17. 07/05/10.

D.18.10 MX

- 1) The ratio of the maximum number of rows permitted relative to the maximum number of columns permitted has been increased from 3 to 6. This means that a matrix with 6 levels will always be accepted even if the number of rows/zones exactly equals its maximum. However, if you have fewer zones/rows than the maximum, the number of permitted levels will increase in proportion. 10.9.5. 20/03/09.
- 2) The maximum number of rows has been further increased to 9 times the columns/zones in order to provide even more "headroom" for stacked matrices in 10.9.13. 25/10/09.
- 3) An option to define sectors by zone interactively added. 10.9.8. 18/06/09

- 4) Matrices dumped in EMME/2 format to ascii (.txt) files may now have their number of decimal places defined. 10.9.8. 20/06/09.
- 5) The first matrix input into MX as part of standard matrix batch files MXADD, UFM2CSV, etc. etc. is now closed immediately after it has been read in in order to reduce the possibility that two separate applications of **MX** (or indeed any programs) operating in different cores will both try to open the same matrix file at the same time. 10.9.13. 23/10/09.
- 6) The QUIET option can now be included in the command line for M1 and MXM1 so that a matrix can be created from a .dat file without grabbing the screen at all. Release Version 10.9.14 09/12/09.
- 7) The standard batch files UFMSTACK and UFMUNSTACK now have an option to run in QUIET mode. Release Version 10.9.17. 09/06/10.

D.18.11 SATCH

- 1) The default value of DEMAND has been changed to F; i.e., output trip matrices are based on actual flows, not demand flows, by default. 10.9.6. 17/04/09.
- 2) A second table has been added comparing O/D totals in the output trip matrix with the corresponding network flows **after** Furnessing has been carried out. 10.9.6. 17/04/09.

D.18.12 SATCOBA

- 1) Two new options have been added to (a) output flows from a single network disaggregated by vehicle class (in addition to by user class) and b) to output such flows in units of either PCUs/hr or vph. See 15.42.2. 10.9.10. 13/08/09.
- 2) A new option permits a node conversion file to be input so that 5-digit node numbers may be converted to 4-digit numbers with the added benefit that the same conversions may be applied across any number of networks which may have different nodes included (e.g., do something vrs. Do-min). See 15.42.6. 10.9.16 01/05/10.

D.18.13 SATPIG

- 1) New options have been added to control (and in particular to increase) the number of paths output. Thus if ALLOD = T at least one route is included for every O-D pair whether or not it has any trips in its trip matrix cell. Equally a new parameter PODMIN sets an inclusion test based on a minimum fractional use of a path – in addition to FPHMIN which tests the absolute flow in pcu/hr. See 12.6. 10.9.10. 14/08/09.
- 2) Output files under TRPFOR = T now include both the absolute flow in pcus/hr **and** (new) the fractional flow on the first record for every route.



D.18.14 CASSINI

- 1) A new program to enable Network parameters such as MASL, NITA etc. to be adjusted between external demand loops dependent on the level of convergence reported by the demand model (e.g., DIADEM) in order to “relax” the convergence criteria for the SATURN assignment. See 15.54. 10.9.10 04/09/09

D.18.15 SATWIN


- 1) Option to link the various files used by **SATURN** to their respective programs within Windows Explorer. See 3.6.6. 10.9.12 26/10/09.
- 2) Increase in the number of different sets of **SATURN** executables that may be selected on the start-up screen from 10 to 15. See 3.6.1. 10.9.12 26/10/09.
- 3) For each event, the selected working folder and program folder are saved to enable previous ‘events’ to be re-run more easily. Option to ‘save’ event log for subsequent re-importing back into **SATWIN**. See 3.6.5. 10.9.12 26/10/09.
- 4) Location of temporary SATWIN.BAT files moved to core install directory (eg C:\SATWIN\TEMP)
- 5) New options to select QUICK / QUIET = TRUE for all **SATURN** programs through toggle option. See 15.55 10.9/10 04/09/09.
- 6) Introduction of a new ‘Non-Core Alternatives’ sub-menu that enables users to run either:
 - the previous v10.9.12 releases of SATNET and SATALL exe’s rather than the new SATURN 10.9.17 versions (as called by SATNETX.BAT and SATALLX.BAT separately or SATURNX.BAT combined); or
 - a hybrid option of SATNET v10.9.17 and SATALL v10.9.12 (as accessed by SATNET.BAT and SATALLX.BAT separately and SATURNH.BAT combined) that will provide the benefits of more comprehensive network coding checks whilst still using the earlier SATALL version.

D.18.16 Documentation

- 1) A full update has been carried out for the November 2009 release of 10.9.12 with on-going updates up to the latest versions.

DVV / IW 14/06/10

D.19 Version Control

| JOB NUMBER: 5092122 | | DOCUMENT REF : App D18.doc | | | | |
|---------------------|-----------------------------|--|---------|----------|------------|----------|
| Revision | Purpose / Description |  | | | | |
| | | Originated | Checked | Reviewed | Authorised | Date |
| 1 | First additions | DVV | | | | 16/03/07 |
| 2 | New document extract | | | | | |
| 3 | | | | | | |
| 3.1 | | | | | | |
| 3.2 | | | | | | |
| 3.2i | | | | | | |
| 3.2ii | | | | | | |
| 3.3 | | | | | | |
| 3.4 | | | | | | |
| 3.5 | Web Release for Jul 07 | DVV | NP | IW | IW | 19/07/07 |
| 3.6 | SATURN v10.8 Release | DVV | NP | IW | IW | 19/03/08 |
| | Post Full Release Updates | DVV | | | | 25/04/08 |
| 3.7 | Web Release for Jul 08 | DVV | NP | IW | IW | 07/07/08 |
| 3.8 | Web release – Dec 08 | DVV | NP | IW | IW | 12/12/08 |
| 3.8.21 | Web release – Feb 09 | DVV | NP | IW | IW | 16/02/09 |
| 3.8.22 | Web release – Jun 09 | DVV | NP | IW | IW | 25/06/09 |
| 10.9.10 | SATURN v10.9 Release | DVV | DG | IW | IW | 04/09/09 |
| 10.9.12 | SATURN v10.9 Release (Full) | DVV | DG | IW | IW | 29/10/09 |
| 10.9.17 | Web release – Jun 10 | DVV | NP | IW | IW | 22/06/10 |
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